
मिट्टी का तेल — विशिष्टि
(चौथा पुनरीक्षण)

Kerosene — Specification
(*Fourth Revision*)

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FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Petroleum and Their Related Products of Synthesis or Biological Origin Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council

This standard was first published in 1959 and subsequently revised in 1968, 1974 and 2016.

It was first revised to include two grades of kerosene, namely, SK grade and 1K grade. It was amended in 1972 in order to modify the requirements of 1K grade kerosene. The second revision was prepared in 1974 in light of the market requirement of kerosene in the country and since the production of 1K grade kerosene in the country was discontinued, it was deleted from the specification and retaining only SK grade.

Further, the colour requirement of SK grade kerosene was reduced from +21 Saybolt to +10 Saybolt through an amendment in 1993. In accordance with the decision taken by Government of India that kerosene to be supplied through Public Distribution System (PDS) would be coloured blue, requirements for suitable blue dye, its concentration range and its colour requirements in case of coloured kerosene were included.

In the third revision, sulphur content limit has been reduced to address the environmental concern in phased manner. Further, for the burning quality test it has been specified that it is to be done at refinery end and applicable only for supply made to railways as a footnote. Further all the amendments issued have been incorporated. The test methods have been updated.

In this revision, a new grade of low sulphur kerosene (Grade A) is included besides the existing grade (Grade B), considering the request received from Ministry of Environment, Forest and Climate Change, Government of India to help reducing the indoor air pollution. Amendment No. 1 issued in June 2017 is also incorporated.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS : 2 : 1960 Rules for Rounding off numerical values (*revised*). The number of significant places retained in the rounded off value should be the same as that of specified value in this standard.

Indian Standard

KEROSENE — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard prescribes requirements and methods of sampling and test of kerosene intended for use as an illuminant and as a fuel.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision, and parties to agreements based on the standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
1260 (Part 1) : 1973	Pictorial marking for handling and labeling of goods: Part 1 Dangerous good (<i>first revision</i>)
1447 (Part 1) : 2000	Petroleum and its products — Methods of sampling: Part 1 Manual sampling (<i>first Revision</i>)
1448	Method of test for petroleum and its products:
[P : 2] : 2007	Part 2 Petroleum products and lubricants — Neutralization number — Potentiometric titration method
[P : 5] : 1970	Part 5: Burning quality
[P : 13] : 1960	Part 13: Colour by lovibond tintometer
[P : 14] : 1960	Part 14 : Colour by saybolt chronometer
[P : 15] : 2004 /ISO 2160 : 1998	Petroleum products — Corrosiveness to copper — Copper strip test
[P : 16] : 2016	Part 16: Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method
[P : 18] : 1991	Part 18 Distillation of petroleum products

IS No.

Title

[P : 20] : 1998	Part 20 Determination of flash point by Abel apparatus
[P : 31] : 1968	Part 31 Smoke point
[P : 34] : 1979	Determination of sulphur in petroleum products lamp (<i>second revision</i>)

3 GRADES

There shall be two grades of kerosene as specified below:

- a) Grade A — Low sulphur kerosene; and
- b) Grade B — Kerosene.

NOTE — The implementation of the specifications of each of these two grades with respect to end application, geographical area of application, timing, etc. shall be as per the notification issued by the Government of India from time-to-time.

4 REQUIREMENTS

4.1 The material shall consist of refined petroleum distillates. It shall be free from visible water, sediment and suspended matter. A suitable blue dye of appropriate concentration may also be added, wherever required.

4.1.1 Dye

A suitable blue dye of alkyl amino anthraquinone type shall be added to kerosene required to be dyed for the purpose of easy product identification. Such dye shall be added in the concentration range of 4 to 6 ppm of active ingredient (*see* Annex A for the test method) to the kerosene and the dyed kerosene shall also comply with the requirements given in **4.2**

4.2 The material shall also comply with the requirements given in Table 1, when tested according to appropriate methods prescribed under 'P' series of IS 1448 reference to which is given in col 4 of the Table 1 shall be used.

4.3 All the test methods referred to in this standard include a precision statement. The interpretation of results based on test method/precision shall be used, whenever applicable. In case of dispute, the procedure described in ISO 4259 shall be used.

Table 1 Specification for Kerosene
(Clause 4.2)

Sl. No.	Charecteristic	Requirement		Test Method Refer to [P:] of IS 1448/ISO/ASTM/IP/ Annex IS 1459
		Grade A	Grade B	
(1)	(2)	(3)	(4)	(5)
i)	Appearance	Clear and bright. Free from un-dissolved water, foreign matter and other visible impurities	Clear and bright. Free from un-dissolved water, foreign matter and other visible impurities	Visual
ii)	Acidity, inorganic	Nil	Nil	ISO 6618/ASTM D974 ¹⁾ / IP 139
iii)	Burning quality ²⁾			[P : 5] ¹⁾ /IP 10
	a) Char Value, mg/kg of oil consumed, <i>Max</i>	20	20	
	b) Bloom on glass Chimney	Not darker than grey	Not darker than grey	
iv)	Colour			
	a) Saybolt (in case of undyed Kerosene) ³⁾ , <i>Min</i>	10	10	[P : 14] ¹⁾ /ASTM D 156
	b) Visual (in case of dyed Kerosene)	Blue	Blue	Visual/Annex A ¹⁾
v)	Copper strip corrosion for 3 h at 50°C	Not worse than No. 1	Not worse than No. 1	[P : 15] ¹⁾ / ASTM D 130 / IP 154
vi)	Density at 15°C, kg/m ³	Not limited, but to be reported	Not limited, but to be reported	[P : 16] ¹⁾ /ISO 12185/ ASTM D 1298/ ASTM D 4052
vii)	Distillation			[P : 18] ¹⁾ /ISO 3405/ASTM D 86
	a) Percent recovered below 200°C, percent (v/v), <i>Min</i>	20	20	
	b) Final boiling point, °C, <i>Max</i>	300	300	
viii)	Flash point (Abel), °C, <i>Min</i>	35	35	[P : 20] ¹⁾ /ISO 13736/ IP 170
ix)	Smoke Point ⁴⁾ , mm, <i>Min</i>	18	18	P : 31/ISO 3014 ¹⁾ / ASTM D1322/ IP 598
x)	Total Sulphur Content, percent, m/m, <i>Max</i>	0.10	0.20	[P : 34]/ISO 8754 ¹⁾ /ASTM D4294/ D 2622/ D 5453

NOTES

¹⁾ In case of dispute, this method shall be the referee method.

²⁾ This test is to be done at refinery end.

³⁾ Where Saybolt chromo meter is not available, Lovibond colour of the sample kept in an 18 cell may be measured according to IS 1448 : [P : 13] in which case the colour shall not be deeper than standard white (IP 4.0). However, in case of dispute P : 14 shall be referee method.

⁴⁾ For supplies to Defence and Railways signal lamps the smoke point of the product shall be 22 mm, *Min*.

5 PACKING AND MARKING

5.1 Packing

The material shall be packed in suitable tinplate containers or as agreed to between the purchaser and the supplier and subject to the provision of Red Tariff No.17, Rules and Rates for the Conveyance by Rail of Explosives and Other Dangerous Goods, issued by Indian Railway Conference Association, with any alterations or additions made thereafter.

5.2 Marking

The material shall be supplied in accordance with the marking and delivery instructions given by the purchaser.

Each container shall be marked with the following information:

- a) Name and colour of the material;
- b) Grade of the material;
- c) Manufacturer's name, initials, or trade-mark, if any;
- d) Volume of the contents in litres;

e) Year of packing; and

f) The caution label 'FLAMMABLE' together with the corresponding symbol for labeling dangerous goods as given in Fig. 5 of IS 1260 (Part 1).

5.3 BIS Certification Marking

The product may also be marked with standard mark.

5.3.1 The use of the standard mark is governed by the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations made there under. The details of the conditions under which the licence for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

6.1 Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 1).

6.2 Test on flash point shall be conducted on individual samples and the rest on the composite samples.

ANNEX A

(Clause 4.1.1)

MEASUREMENT OF CONCENTRATION OF DIALKYL AMINO-ANTHRAQUINONE DYE IN KEROSENE BY UV-VISIBLE SPECTROSCOPY

A-1 GENERAL

This method is for the determination of concentration of dialkyl amino-anthraquinone type dye in kerosene.

A-2 OUTLINE OF THE METHOD

The ultraviolet absorption spectrum of the kerosene sample having dialkyl amino-anthraquinone type dye in the range of 1 to 20 ppm is recorded and a baseline correction technique is used to compensate for background absorption of the sample. The maximum value of absorption obtained in the 645 to 655 nm range is fitted in a standard curve of concentration of dialkyl amino-anthraquinone dye versus absorption and to find out the concentration of dye in the sample under test.

A-3 APPARATUS

A-3.1 UV-Visible Spectrophotometer — Capable of operation in the range of 200 to 800 nm with a special slit width of 1 nm and capable of 0.01 percent precision in absorbance measurement at 1.0 level at this resolution.

A-3.2 Absorption Cells — Quartz, 10 mm path length, polytetrafluoroethylene (PTFE) cover.

A-3.3 Millipore Microfiltration Assembly

A-3.4 PTFE Filters — Of 0.8 µm size.

A-4 SAMPLING

About 100 ml sample is filtered through PTFE (0.8 µm) membrane to make the sample free from any insoluble particles.

A-5 PROCEDURE

Wash the absorption cells properly and dry them. Fill one 10 mm absorption cell with the filtered dyed sample. Fill an identical cell with sample without dye to be used as a reference. Measure the absorbance at 645 to 655 nm range. Make successive dilutions with kerosene without dye, as required, if the absorbance is greater than 1.0 at 645 to 655 nm range. Determine the maximum absorption value of the single peak in this region. Fit the absorption value in the standard curve of absorption versus concentration of dye (*see Fig. 1*) and find out the concentration of dye in the unknown sample.

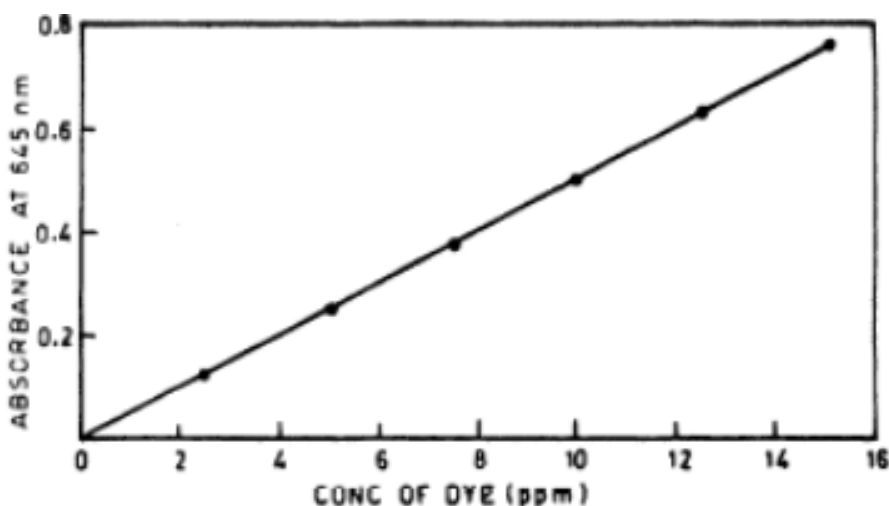


FIG. 1 STANDARD CURVE OF ABSORBANCE VS. CONC OF DYE

ANNEX B

BIBLIOGRAPHICAL REFERENCES

<i>International Standard/ Other Publication</i>	<i>Title</i>
ISO 2160 : 1998	Petroleum products — Corrosiveness to copper — Copper strip test
ISO 3014 : 1993	Petroleum products — Determination of the smoke point of kerosene
ISO 3405 : 2011	Petroleum products — Determination of distillation characteristics at atmospheric pressure
ISO 6618 : 1997	Petroleum products and lubricants — Determination of acid or base number — Colour-indicator titration method
ISO 8754 : 2003	Petroleum products — Determination of sulfur content — Energy dispersive X-ray fluorescence spectrometry
ISO 12185 : 1996	Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method
ISO 13736 : 2103	Determination of flash point — Abel closed-cup method
ASTM D 86-17	Standard test method for Distillation of Petroleum Products
ASTM D 130-18	Standard test method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
ASTM D 156-15	Standard Test Method for Saybolt Color of Petroleum Products (Saybolt Chromometer Method)
ASTM D 1298-12b	Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
ASTM D 1322-18	Standard Test Method for Smoke Point of Kerosene and Aviation Turbine Fuel
ASTM D 2622-16	Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry
ASTM D 4052-16	Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
ASTM D 4294-16e1	Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry
ASTM D 5453-16e1	Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
IP 154	Petroleum products — Corrosiveness to copper — Copper strip test
IP 170	Determination of flash point — Abel closed-cup method
IP 598	Petroleum products — Determination of the smoke point of kerosine, manual and automated method

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Amendments Issued Since Publication

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